

Application/Control Number: 09/499,619

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1. (Amended) A display device comprising:

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a substrate;
a plurality of first signal lines formed over said substrate;
a plurality of second signal lines extending across said first signal lines over said

substrate;

a plurality of switching elements formed at each intersection of said first and second signal lines, each of said switching elements comprising at least one first thin film transistor wherein a gate electrode of said first thin film transistor is electrically connected to one of said plurality of first signal lines and an impurity region of said first thin film transistor is electrically connected to one of said plurality of second signal lines;

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END

a smoothing film comprising an organic resin formed over said switching elements;

a plurality of pixel electrodes formed over said smoothing film and electrically connected to said switching elements through contact holes formed in said smoothing film; and

a first driver circuit comprising at least one IC chip electrically connected to said plurality of second signal lines; and

a second driver circuit electrically connected to said plurality of first signal lines, wherein said second driver circuit comprises second thin film transistors formed over said substrate.

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2. The display device according to claim 1 wherein said pixel electrodes comprise indium tin oxide.

CANCEL CLAIMS 3-4

~~3~~ (Amended) The display device according to claim 1 wherein at least one of said first and second thin film transistors has a channel region comprising semi-amorphous silicon.

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~~4~~ (Amended) The display device according to claim 1 wherein each of said first and second thin film transistors has a top-gate structure.

~~5~~ The display device according to claim 1 wherein said smoothing film comprises polyimide.

by
~~6~~ 6. (Amended) A display device comprising:
a substrate;
a plurality of first signal lines formed over said substrate;
a plurality of second signal lines extending across said first signal lines
over said substrate;
a plurality of switching elements formed at each intersection of said first and

second signal lines, each of said switching elements comprising at least one first thin film transistor, wherein a gate electrode of said first thin film transistor is electrically connected to one of said plurality of first signal lines and an impurity region of said first thin film transistor is electrically connected to one of said plurality of second signal lines;

a smoothing film comprising an organic resin formed over said switching elements;

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a plurality of pixel electrodes formed over said smoothing film and electrically connected to said switching elements through contact holes formed in said smoothing film; and

a first driver circuit comprising at least one IC chip electrically connected to said plurality of second signal lines; and

a second driver circuit electrically connected to said plurality of first signal lines, wherein said second driver circuit comprises second thin film transistors formed over said substrate,

wherein said first driver circuit is connected to said substrate through a tape automated bonding process.

~~7~~ 7. The display device according to claim ~~6~~ wherein said IC chip is mounted on a flexible support.

~~8~~ 8. The display device according to claim ~~6~~ wherein said pixel electrodes comprise indium tin oxide.

CANCEL CLAIMS 11-12

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~~9~~ 9. (Amended) The display device according to claim ~~6~~ wherein at least one of said first and second thin film transistors has a channel region comprising semi-amorphous silicon.

~~10~~ 10. (Amended) The display device according to claim ~~6~~ wherein each of said first and second thin film transistors has a top-gate structure.

- 11 ~~10.~~ A display device comprising:
a substrate;
a plurality of first signal lines formed over said substrate;
15 a plurality of second signal lines extending across said first signal lines over said substrate;
a plurality of switching elements formed at each intersection of said first and second signal lines, each of said switching elements comprising at least one thin film transistor;
20 a smoothing film comprising an organic resin formed over said switching elements;
a plurality of pixel electrodes formed over said smoothing film and electrically connected to said switching elements through contact holes formed in said smoothing film; and
25 a driver circuit comprising at least one IC chip for driving said switching elements,
wherein said IC chip is formed on a flexible support and said flexible support is connected to said substrate.

12 ~~11.~~ The display device according to claim 11 wherein said thin film transistor has a top-gate structure.

13 ~~12.~~ The display device according to claim 11 wherein said pixel electrodes comprise indium tin oxide.

14 ~~13.~~ The display device according to claim 11 wherein said IC chip is electrically connected to either one of said first signal lines or said second signal lines.

15 ~~14.~~ The display device according to claim 11 wherein said driver circuit further comprises thin film transistors formed over said substrate.

16 ~~15.~~ The display device according to claim 11 wherein said thin film transistor has a channel region comprising semi-amorphous silicon.

17 ~~16.~~ (Amended) A display device comprising:
a substrate;
8b a plurality of first signal lines formed over said substrate;
a plurality of second signal lines extending across said first signal lines over said substrate;
a plurality of switching elements formed at each intersection of said first and second signal lines, each of said switching elements comprising at least one first thin film transistor, wherein a gate electrode of said first thin film transistor is electrically connected to
c one of said plurality of first signal lines and an impurity region of said first thin film transistor

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is electrically connected to one of said plurality of second signal lines;

a smoothing film comprising an organic resin formed over said switching elements;

a plurality of pixel electrodes formed over said smoothing film and electrically connected to said switching elements through contact holes formed in said smoothing film; and

a first driver circuit comprising at least one IC chip electrically connected to said plurality of second signal lines; and

a second driver circuit electrically connected to said plurality of first signal lines

wherein said second driver circuit comprises second thin film transistors formed over said substrate,

wherein said IC chip is mounted over said substrate. ¹⁷

¹⁸ 22. (Amended) The display device according to claim ¹⁷ 21 wherein each of said first and second thin film transistors has a top-gate structure.

¹⁹ 23. The display device according to claim ¹⁷ 21 wherein said pixel electrodes comprise indium tin oxide.

CANCEL CLAIMS 24-25

²⁰ 26. (Amended) The display device according to claim ¹⁷ 21 wherein at least one of said first and second thin film transistors has a channel region comprising semi-amorphous silicon.

²¹ 27. A display device comprising:
a substrate;
a plurality of first signal lines formed over said substrate;
a plurality of second signal lines extending across said first signal lines over said substrate;

a plurality of switching elements formed at each intersection of said first and second signal lines, each of said switching elements comprising at least one first thin film transistor wherein a gate electrode of said first thin film transistor is electrically connected to one of said plurality of first signal lines and an impurity region of said first thin film transistor is electrically connected to one of said plurality of second signal lines;

an organic resin film formed over said switching elements;

a plurality of pixel electrodes formed over said organic resin film and electrically

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connected to said switching elements through contact holes formed in said organic resin film;
and

a first driver circuit comprising at least one IC chip electrically connected to said plurality of second signal lines; and

a second driver circuit electrically connected to said plurality of first signal lines, wherein said second driver circuit comprises second thin film transistors formed over said substrate.

~~22~~ 26. The display device according to claim ~~27~~²¹ wherein said organic resin film comprises polyimide.

~~23~~ 29. The display device according to claim ~~27~~²¹ wherein each of said first and second thin film transistors has a top-gate structure.

~~24~~ 30. A display device comprising:
a substrate;
a plurality of first signal lines formed over said substrate;
a plurality of second signal lines extending across said first signal lines over said substrate;
a plurality of switching elements formed at each intersection of said first and second signal lines, each of said switching elements comprising at least one thin film transistor;
an organic resin film formed over said switching elements;
a plurality of pixel electrodes formed over said organic resin film and electrically connected to said switching elements through contact holes formed in said organic resin film;
and
a driver circuit comprising at least one IC chip for driving said switching elements,
wherein said IC chip is formed on a flexible support and said flexible support is connected to said substrate.

~~25~~ 31. The display device according to claim ~~30~~²⁴ wherein said organic resin film

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comprises polyimide.

~~26~~ ³⁴ The display device according to claim ~~30~~ ³⁴ wherein said driver circuit includes a first driver circuit including said IC chip and electrically connected to said plurality of second signal lines and a second driver circuit comprising second thin film transistors and electrically connected to said plurality of first signal lines.

~~27~~ ³⁵ A display device comprising:

- a substrate;
- a plurality of first signal lines formed over said substrate;
- a plurality of second signal lines extending across said first lines over said substrate;
- a plurality of switching elements formed at each intersection of said first and second signal lines, each of said switching elements comprising at least one first thin film transistor, wherein a gate electrode of said first thin film transistor is electrically connected to one of said plurality of first signal lines and an impurity region of said first thin film transistor is electrically connected to one of said plurality of second signal lines;
- an organic resin film formed over said switching elements;
- a plurality of pixel electrodes formed over said organic resin film and electrically connected to said switching elements through contact holes formed in said organic resin film;
- and
- a first driver circuit comprising at least one IC chip electrically connected to said plurality of second signal lines; and
- a second driver circuit electrically connected to said plurality of first signal lines wherein said second driver circuit comprises second thin film transistors formed over said substrate,

wherein said IC chip is mounted over said substrate.

~~28~~ ³⁶ The display device according to claim ~~35~~ ³⁶ wherein said organic resin film comprises polyimide.

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~~29~~ ²⁹ 29. The display device according to claim ~~35~~ ²⁹ wherein each of said first and second thin film transistors has a top-gate structure.

~~30~~ ³⁰ 30. A display device comprising:

- a substrate;
- a plurality of first signal lines formed over said substrate;
- a plurality of second signal lines extending across said first signal lines over said substrate;
- a plurality of switching elements formed at each intersection of said first and second signal lines, each of said switching elements comprising at least one first thin film transistor wherein a gate electrode of said first thin film transistor is electrically connected to one of said plurality of first signal lines and an impurity region of said first thin film transistor is electrically connected to one of said plurality of second signal lines;
- a smoothing film formed over said switching elements;
- a plurality of pixel electrodes formed over said smoothing film and electrically connected to said switching elements through contact holes formed in said smoothing film; and
- a first driver circuit comprising at least one IC chip electrically connected to said plurality of second signal lines; and
- a second driver circuit electrically connected to said plurality of first signal lines, wherein said second driver circuit comprises second thin film transistors formed over said substrate.

~~31~~ ³¹ 31. The display device according to claim ~~30~~ ³¹ wherein each of said first and second thin film transistors has a top-gate structure.

~~32~~ ³² 32. A display device comprising:

- a substrate;
- a plurality of first signal lines formed over said substrate;
- a plurality of second signal lines extending across said first signal lines over said substrate;
- a plurality of switching elements formed at each intersection of said first and

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second signal lines, each of said switching elements comprising at least one thin film transistor;
 a smoothing film formed over said switching elements;
 a plurality of pixel electrodes formed over said smoothing film and electrically connected to said switching elements through contact holes formed in said smoothing film; and
 a driver circuit comprising at least one IC chip for driving said switching elements.

wherein said IC chip is formed on a flexible support and said flexible support is connected to said substrate.

33 38. The display device according to claim 32 wherein said driver circuit includes a first driver circuit including said IC chip and electrically connected to said plurality of second signal lines and a second driver circuit comprising second thin film transistors and electrically connected to said plurality of first signal lines.

34 40. A display device comprising:
 a substrate;
 a plurality of first signal lines formed over said substrate;
 a plurality of second signal lines extending across said first signal lines over said substrate;
 a plurality of switching elements formed at each intersection of said first and second signal lines, each of said switching elements comprising at least one first thin film transistor, wherein a gate electrode of said first thin film transistor is electrically connected to one of said plurality of first signal lines and an impurity region of said first thin film transistor is electrically connected to one of said plurality of second signal lines;
 a smoothing film formed over said switching elements;
 a plurality of pixel electrodes formed over said smoothing film and electrically connected to said switching elements through contact holes formed in said smoothing film; and
 a first driver circuit comprising at least one IC chip electrically connected to said plurality of second signal lines; and
 a second driver circuit electrically connected to said plurality of first signal lines wherein said second driver circuit comprises second thin film transistors formed over said

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substrate,

wherein said IC chip is mounted over said substrate.

35 ~~35~~ 11 The display device according to claim 1 wherein said driver circuit includes a first driver circuit including said IC chip and electrically connected to said plurality of second signal lines and a second driver circuit comprising second thin film transistors and electrically connected to said plurality of first signal lines.

36 ~~36~~ 12 The display device according to claim 1 wherein each of said first and second driver circuits comprises a shift register circuit.

37 ~~37~~ 6 The display device according to claim 1 wherein each of said first and second driver circuits comprises a shift register circuit.

38 ~~38~~ 17 The display device according to claim 2 wherein each of said first and second driver circuits comprises a shift register circuit.

39 ~~39~~ 21 The display device according to claim 2 wherein each of the first and second driver circuits comprises a shift register circuit.

40 ~~40~~ 27 The display device according to claim 3 wherein each of the first and second driver circuits comprises a shift register circuit.

41 ~~41~~ 30 The display device according to claim 3 wherein each of the first and second driver circuits comprises a shift register circuit.

42 ~~42~~ 34 The display device according to claim 4 wherein each of said first and second driver circuits comprises a shift register circuit.

43 ~~43~~ 39 The display device according to claim 1 wherein said first driver circuit comprises a latch circuit.

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~~44~~ ⁶ 50. The display device according to claim ~~9~~ wherein said first driver circuit comprises a latch circuit.

~~45~~ ¹⁷ 51. The display device according to claim ~~21~~ wherein said first driver circuit comprises a latch circuit.

~~46~~ ²¹ 52. The display device according to claim ~~27~~ wherein said first driver circuit comprises a latch circuit.

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~~47~~ ²⁷ 53. The display device according to claim ~~33~~ wherein said first driver circuit comprises a latch circuit.

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~~48~~ ³⁰ 54. The display device according to claim ~~39~~ wherein said first driver circuit comprises a latch circuit.

³⁴
~~49~~ ³⁴ 55. The display device according to claim ~~45~~ wherein said first driver circuit comprises a latch circuit.—

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